

MIGRATION OF BIRDS.

Geese flying southward.—Montgomery, Alabama, 29th; Lead Hill, Arkansas, 3d; Red Bluff, California, 14th to 17th, 22d; Sacramento, California, 3d to 17th, 28th, 29th; New Haven, Connecticut, 12th; Fort Bennett, Dakota, 2d; Yankton, Dakota, 16th; Forts Sully and Yates, Dakota, 31st; Washington City, District of Columbia, 18th; Boise City, Idaho, 9th; Cairo, Illinois, 10th; Charleston, Illinois, 27th, 28th, Terre Haute, Indiana, 27th, 30th; Fort Sill, Indian Territory, 20th, 21st, 23th; Salina, Kansas, 2d; Yates Centre, Kansas, 3d, 8th, 19th, 22d, 25th; Westmoreland, Kansas, 7th; Allison, Kansas, 12th, 16th, 23d; Elk Falls, Kansas, 16th; Independence, Kansas, 17th; Fort Scott, Kansas, 22d; Liberty Hill, Louisiana, 24th, 25th, and 26th; Point Pleasant, Louisiana, 8th; Manistique, Michigan, 5th; Mottville, Michigan, 26th to 29th; Port Huron, Michigan, 29th; Moorhead, Minnesota, 13th; Saint Paul, Minnesota, 6th; Lamar, Missouri, 2d; Saint Louis, Missouri, 27th; North Platte, Nebraska, 3d; Yutan, Nebraska, 3d, 10th, 16th, 18th, 19th, 21st; Harvard, Nebraska, 2d, 24th, 28th; Omaha, Nebraska, 21st; Humphrey, New York, 18th, 21st; New River Inlet, North Carolina, 25th; Tiffin, Ohio, 27th; Garrettsville, Ohio, 30th; Roseburg, Oregon, 14th, 31st; Albany, Oregon, 15th, 22d; Chambersburg, Pennsylvania, 9th, 30th; Wellsborough, Pennsylvania, 9th, 17th, 18th, 31st; Block Island, Rhode Island, 8th; Chattanooga, Tennessee, 19th; Memphis, Tennessee, 28th; Indianola, Texas, 3d, 13th, 14th, 16th; Corsicana, Texas, 8th; Brownsville, Texas, 9th; Palestine, Texas, 17th; Bird's Nest, Virginia, 19th; Cape Henry, Virginia, 29th; Embarras, Wisconsin, 5th; Milwaukee, Wisconsin, 27th, 28th.

Geese flying northward.—Mobile, Alabama, 25th; Bismarck, Dakota, 8th; Guttenberg, Iowa, 25th; Cleveland, Ohio, 29th.

Ducks flying southward.—Little Rock, Arkansas, 14th, 21st; Elk Falls, Kansas, 18th; Yates Centre, Kansas, 18th, 31st; Liberty Hill, Louisiana, 13th, 19th; Point Pleasant, Louisiana, 19th; Yutan, Nebraska, 31st; Kitty Hawk, North Carolina, 18th, 24th, 27th; Indianola, Texas, 1st, 3d, 13th, 14th, 16th, 23d, 27th; Cape Henry, Virginia, 12th, 27th, 29th.

Ducks flying northward.—Mottville, Michigan, 27th, 30th.

Cranes flying southward.—Fort Bennett, Dakota, 2d; Fort Sill, Indian Territory, 16th, 20th; Allison, Kansas, 3d, 16th, 27th, 30th, 31st; Salina, Kansas, 2d; Yates Centre, Kansas, 10th; Elk Falls, Kansas, 29th; Point Pleasant, Louisiana, 24th; Harvard, Nebraska, 2d, 5th, 19th.

Brants flying southward.—Fort Buford, Dakota, 11th, 12th; Indianola, Texas, 16th, 29th.

POLAR BANDS.

Lead Hill, Arkansas, 4th, 21st.
Los Angeles, California, 4th.
Archer, Florida, 2d, 7th, 20th, 22d.
Riley, Illinois, 12th, 30th, 31st.
Guttenberg, Iowa, 3d.
Ninnescah, Kansas, 15th, 20th, 23d, 26th.
Thornville, Michigan, 17th.
Escanaba, Michigan, 17th, 18th, 27th.
Wauseon, Ohio, 15th, 25th.
Toledo, Ohio, 20th.
Nashville, Tennessee, 7th, 11th, 24th, 25th, 31st.
El Paso, Texas, 9th, 15th.
Bainbridge Island, Washington Territory, 15th.
Prairie du Chien, Wisconsin, 17th.
Fort Bridger, Wyoming, 19th, 25th.

SAND STORMS.

Fort Yates, Dakota, 4th, 8th.
Fort Sill, Indian Territory, 12th.
Fort Assinaboine, Montana, 3d.

WATER-SPOUTS.

The s. s. "Ailsa," J. W. Sansom, commanding, in N. 13° 18', W. 79° 54', passed a water-spout bearing west, two miles distant.

ERRATA.

On page 19 of the REVIEW for January, 1885, in the table of miscellaneous data, the departure from the normal temperature at Fort Concho, Texas, given as $-36^{\circ}.5$, should read $-6^{\circ}.5$.

On page 235 of the REVIEW for September, 1885, in the table of miscellaneous data, the altitude of El Paso, Texas, given as 6,764 feet, should read 3,764 feet.

Meteorological record of voluntary observers and Army post surgeons, October, 1885.

The maximum and minimum temperatures at stations marked thus (*) are from readings of other than standard instruments.

Stations.	Temperature.				Stations.	Temperature.			
	Maximum.	Minimum.	Mean.	Rainfall.		Maximum.	Minimum.	Mean.	Rainfall.
Alabama.	0	0	0	<i>Inches</i>	Indiana.	0	0	0	<i>Inches</i>
Birmingham *	80	32			Fort Wayne *	77	30	51.8	4.90
Greenborough *	81	42	61.5	1.37	Guilford *	74	30	51.2	2.58
Mount Vernon B'ks.	85	35	64.1	1.35	Jeffersonville *	78	34	52.5	4.28
Arizona.					Laconia *	77	30	52.6	4.50
McDowell, Fort.	104	39	72.3	0.26	Lafayette *	77	30	48.8	2.96
Mojave, Fort.	103	42	73.4	trace.	Logansport *	83	30	51.3	3.68
Tucson				0.00	Mauzy *	72	24	44.6	2.89
Arkansas.					Spiceland *	73	29	48.8	1.90
Lead Hill *	95	29	56.0	1.22	Sunman *	70	26	51.1	2.62
Mount Ida *	86	28	59.5	0.30	Terre Haute *	72	34	44.4	4.14
California.					Vevay *	78	32	53.9	2.62
Alcatraz Island.	60	50	56.6	0.50	Iowa.				
Angel Island	86	51	60.3	0.63	Cedar Rapids *	72	24	45.0	2.50
Benicia Barracks.	92	53	63.3	0.30	Cedar Rapids *	72	22	46.0	1.34
Bidwell, Fort.	86	57	57.0	0.73	Creco *	73	22	42.5	1.14
Cahuenga Valley				0.06	Des Moines	80	23	48.2	
College City *	101	42	65.0	0.96	Guttenberg *	80	24	46.0	1.41
Gaston, Fort	91	28	60.9	0.31	Humboldt *	76	22	43.7	
Mason, Fort	71	51	58.6	0.72	Independence *	70	27	45.2	1.62
Murieta *	100	35	61.2	0.00	Indianola *	75	25	49.3	3.35
Oakland *	75	45	59.9	0.30	Logan *				4.20
Oroville *	94	52	69.2	trace.	Madison, Fort *	75	29		3.25
Poway *	97	41	63.4	0.06	Manchester	78	27	47.0	1.48
Presidio of San F.	74	46	57.8	0.46	Monticello	74	24	45.4	2.65
Sacramento *	90	30	64.4	trace.	Mount Vernon *	78	27	48.1	2.20
Salinas *	72	38	56.2	0.08	Muscataine *	80	26	47.6	2.80
San Rafael *	94	34		0.70	Oskaloosa *			44.9	2.65
Susanville				0.50	Oskaloosa b *	75	36		
Colorado.					West Union *	73	20	42.7	0.92
Lewis, Fort	75	17	47.9	0.48	Kansas.				
Lyon, Fort	85	24	51.9	0.60	Allison *	93	25	49.8	2.31
Pueblo	81	30	50.2	0.57	Atchison *	79	28	50.9	3.75
Connecticut.					Elk Falls *	32			2.00
Bethel				4.75	Emporia *	80	28		1.28
Hartford	72	27	48.2	4.48	Fort Scott	78	31	56.0	1.65
North Colebrook *	70	32	51.7	3.97	Independence *	84	30	54.4	1.79
Southington	73	27	49.2	3.55	Lawrence	77	29	51.2	3.32
Voluntown *	72	30		5.25	Ninnescah *	90	34	51.7	2.02
Dakota.					Salina *	71	39	54.0	0.04
Abr. Lincoln, Fort.	84	13	43.6	0.70	Topeka *	88	26	54.1	2.40
Meade, Fort	81	22	48.3	0.74	Wellington *	81	25	53.8	2.41
Pembina, Fort.	73	18	38.0	0.35	W. Leavenworth	79	31		5.55
Randall, Fort.	83	20	48.4	1.16	Westmoreland *	87	24	50.0	2.86
Richardson *	79	22	48.9	1.00	Wyandotte *	78	28	53.0	4.12
Sisseton, Fort.	80	12	42.6	0.70	Yates Centre *	82	26	50.5	3.00
Sully, Fort	86	21	47.7	0.03	Kentucky.				
Totten, Fort.	80	22	49.5	0.62	Frankfort	77	32	53.1	4.78
Vermillion	84	23	49.3	0.98	Richmond	75	29	52.7	4.88
Webster *	83	21	45.3	0.79	Louisiana.				
Yates, Fort.	87	8	43.9	0.44	Grand Coteau	80	42	65.7	0.56
District of Columbia.					Liberty Hill *	76	54	66.7	1.80
Distributing Resv'rs	76	35	56.4	9.57	Luling *	80	37	62.2	0.00
Receiving Resv'rs *	75	37	55.9	10.88	Point Pleasant *	82	40	60.4	1.22
Rock Creek Bridge *	78	39	59.1		Maine.				
West Washington	77	37	57.8	8.77	Buckfield				3.64
Florida.					Cornish *	69	28	46.4	3.85
Archer	88	44	68.9	4.77	Gardiner	66	27	47.6	3.94
Limona *	86	50	70.2	1.95	Kent's Hill	61	25	45.5	4.04
Manatee *	88	55	72.6	1.26	Orono *	70	23	46.5	5.12
Mayport *	86	58	71.7	5.38	Preble, Fort	65	30	50.2	1.31
Meade, Fort				1.19	Maryland.				
Merritt's Island	87	56	73.1	4.61	Cumberland	75	32	51.0	4.14
Saint Augustine, Ft.	84	54	69.9	3.32	Fallston *	75	37	53.3	7.07
Tallahassee *	83	40	65.0	1.35	Great Falls *	75	32	54.0	8.23
Georgia.					McDonogh	72	33	53.2	6.38
Athens	78	34	56.6	4.89	McHenry, Fort	74	38	57.6	5.83
Forayth *	82	42	61.7	4.10	Woodstock	72	30	51.9	10.23
Milledgeville *	78	38	60.8	4.80	Massachusetts.				
Illinois.					Amherst a	71	31	49.0	4.12
Anna	80	36	54.6	3.43	Amherst b	80	24	49.1	3.65
Bunker Hill *	84	30	53.7	4.89	Blue Hill	70	29	48.8	5.92
Collinsville	77	33	51.6	8.52	Deerfield	78	24	49.5	6.48
Charleston *	79	28	50.8	3.24	Dudley	72	32	54.5	3.74
Geneseo				1.20	Fall River *	70	32	52.1	4.45
Mattoon *	81	29	53.0	4.60	Heath *	78	26		
Peoria *	75	30	52.3	2.32	Mendon *	70	29	53.4	
Riley *	69	24	44.8	2.57	New Bedford	70	30	51.3	4.06
Rockford *	70	25	45.0	3.95	Princeton	70	27	47.4	4.66
Sandwich *	74	29	49.6	2.14	Rowe *	70	20	45.2	4.08
South Evanston	70	29		3.51	Somerset *	76	32	53.4	4.34
Sycamore	72	25	44.8	4.05	Taunton	75	29	51.4	3.85
Windsor *	78	25	50.3	4.19	Westborough *	78	28	51.8	4.48
					Worcester *	70	30	47.5	4.81
					Williamstown	72	26	47.0	3.12

Meteorological record of voluntary observers, etc.—Continued.

Stations.	Temperature.				Rainfall.	Stations.	Temperature.				Rainfall.
	Maximum.	Minimum.	Mean.				Maximum.	Minimum.	Mean.		
Michigan.	°	°	°	Inches.		Ohio—Continued.	°	°	°	Inches.	
Birmingham	72	21	43.3	1.61		Hiram *	75	33	48.4	5.19	
Brady, Fort	67	12	40.4	2.45		Jacksonborough *	80	24	50.7	2.00	
East Saginaw	75	18	46.4	3.15		Napoleon *	76	25	48.4	2.78	
Harrieville *	67	20	43.5	4.35		North Lewisburg	79	21	52.0	2.20	
Hudson *	77	13	45.0	4.68		Portsmouth	78	28	51.5	3.69	
Lansing	73	15	44.4	3.60		Tiffin *	78	30	49.6	2.31	
Manistique	68	22	42.7	2.53		Wasson	78	24	46.9	3.03	
Mottville *	72	26	49.0	5.50		Westerville	74	23	48.8	2.83	
Pontwater	72	18	44.0	3.30		Yellow Springs *	74	22	49.4	2.62	
Thornville	76	24	48.0	2.26		Oregon.					
Traverse City *	75	18		2.82		Albany *	84	36	56.3	1.75	
Minnesota.						Bandon *	71	33	50.1	2.45	
Minneapolis *	78	24	42.5	1.76		East Portland *	78	30		1.15	
Northfield	77	23	43.6	2.04		Kola *	77	39	55.6	1.42	
Snelling, Fort	81	22	43.8	1.70		Pennsylvania.					
Missouri.						Altoona	78	30	52.5	3.61	
Carthage	83	29	54.9	1.90		Bloomington *	75	24		7.70	
Centerville	94	23		1.71		Catawissa	80	32	55.8	5.65	
Conception	77	29	43.0	4.83		Chambersburg *	79	36	49.3	4.64	
Independence *	70	25	50.0	2.84		Drifton	77	27	48.7	5.66	
Springfield	80	25		1.75		Dyberry *	72	20	45.0	3.52	
Montana.						Easton *				5.37	
Assinaboine, Fort.	85	14	46.7	0.00		Easton *	83	39	56.5		
Ellis, Fort	82	22	45.8	1.50		Fallingston	75	34	51.6	4.23	
Keogh, Fort	85	12	47.6			Franklin *	72	22	42.1	4.50	
Shaw, Fort	75	21	47.3	0.94		Germantown *	74	33		5.58	
Nebraska.						Gramplian Hills *	78	20	44.4	2.92	
Crete	82	23	47.2	1.07		Mahanoy Plane *	74	35	52.1	5.54	
De Soto *	83	23	48.4	2.01		Quakertown	72	20	49.0	4.29	
Fairbury	88			1.81		South Bethlehem	82	30	51.0	5.54	
Fremont	81	24	47.0	3.81		Tidionte	87	26	46.6	4.82	
Genoa	82	23	48.0	1.60		Troy	80	27	47.0	5.74	
Harvard	92	24		4.00		Washington *	75	28		4.80	
Marquette *	76			2.86		Wilkes Barre	83	30	49.6	4.65	
Robinson, Fort.	88	9	49.4	1.80		Wellsborough *	78	28	50.3	7.50	
Stockham *	84					West Chester	75	33	52.2	6.25	
Tecumseh *	82	25	53.0	3.25		Wysox *	77	28	52.5	6.63	
Yutan	80	31	48.0	2.30		South Carolina.					
Nevada.						Kirkwood *	68	34	53.8	2.89	
Carson City	86	23	52.1	0.12		Pacolet *	68	41	56.2	7.50	
Dermitt, Fort	86	26	55.2	0.12		Spartanburg *	56	12	40.47	5.30	
New Hampshire.						Stateburg *	77	40	59.8	3.52	
Antrim				3.90		Tennessee.					
Ashland				3.84		Ashwood *	76	32	54.0	3.23	
Belmont				2.39		Austin	78	32	55.9	3.21	
Bristol				3.65		Milan	84	31	55.2	2.89	
Contoocook *	76	26	48.3	4.15		Texas.					
Lake Village				2.49		Austin *	84	42	66.2	2.82	
Nashua *	76	27	48.3	3.91		Brown, Fort.	93	55	74.3	9.75	
Wier's Bridge				2.37		Cleburne *	81	34	63.0	0.47	
Wolfborough				3.23		Comfort				0.73	
Woodstock				4.25		Concho, Fort	94	37	66.0		
New Jersey.						Corpus Christi	91	54			
Beverly *	78	34	53.8	3.51		Coriscana				2.05	
Dover	77	29	47.1	5.5		New Ulm	88	43	66.4	1.93	
Moorestown	81	31	51.9	3.48		Vermont.					
Princeton	80	32	53.4	3.29		Brattleborough	63	26	48.0	4.74	
Readington *	78	36	58.2	5.80		Burlington	75	24	48.8	4.77	
Somerville *	75	33	51.8	4.65		Charlotte *	71	22	47.2	7.20	
South Orange *	70	34	52.2	4.35		Dorset	76	19	45.2	2.52	
Pierce City	82	29	54.3	1.40		Lunenburg	74	21	45.7	4.41	
Vineland	77	39	54.7	5.83		Newport *	70	22	45.7	6.41	
New Mexico.						Post Mills Village *	75	21	44.1		
Gallinas Spring				0.35		Stowe				7.69	
Union, Fort	82	11	52.0	0.58		Stratford	70	24	47.9	5.90	
Wingate	80	24	51.5	0.86		Woodstock	75	22	44.8	4.70	
New York.						Virginia.					
Auburn	74	24	51.4	3.95		Accotink *	80	34	56.2	6.97	
Columbus, Fort.	75	33	54.5	4.83		Bird's Nest *	85	41	62.1	2.35	
Cooperstown *	70	26	46.3	4.19		Blackburg	70	28	51.8	6.64	
David's Island	77	35	54.3	4.33		Brulington				4.55	
Factoryville *	78	28	48.4	5.00		Christiansburg *	72	41		7.22	
Humphrey	75	32	47.2	4.17		Dale Enterprise *	78	35	56.0	12.60	
Ithaca	77	26	48.5	5.26		Marion *	69	28	50.5	4.28	
Madison Barracks	72	17	47.7	3.69		Monroe, Fort	80	41	60.2	0.62	
Menand Station *	72	28	49.3	5.38		Snowville *	70	28		6.20	
Mountainville	70	29	49.8	6.09		Summit	79	30	54.2		
Niagara, Fort.	75	31	49.4	3.20		Variety Mills	73	28	52.0	10.70	
North Volney *	75	22	46.7	3.70		Wytheville	70	31	51.4	4.69	
Palermo *	76	21	46.1	3.13		Washington Territory.					
Palmyra *	80	28				Bainbridge Island *	68	35	52.0	4.40	
Penn Yan				2.59		Kenewick *	83	24		0.26	
Plattsburg B's	67	24	46.0	4.57		Pleasant Grove *	83	19		0.06	
West Point	73	23	53.6	5.50		Tacoma *	64	39	51.4	2.47	
White Plains	72	33	53.5	8.40		Townsend, Fort	69	30	52.5	1.00	
North Carolina.						West Virginia.					
Asheville *	77	30	51.0	8.30		Helvetia *	72	29	47.5	5.80	
Flat Rock *	68	31	49.8	12.85		Parkersburg	76	32	49.1	2.13	
Lenoir *	68	32		9.50		Wellsburg				4.67	
Lincolnton *	66	37	52.3	5.44		Wisconsin.					
Raleigh *	78	38	59.0	3.80		Embarras *	76	26	45.4	2.40	
Reidsville *	68	30	54.2			Evansville *	75	30	51.0		
Statesville *	73	33	57.0	7.43		Madison	71	26	44.8	2.37	
Wake Forest *	76	37	58.6	3.67		Manitowoc	67	24	45.4	3.17	
Weldon *	78	37	57.7	5.11		Neillsville *	68	7	38.3	0.50	
Ohio.						Prairie du Chien *	77	25	45.5	1.72	
Cleveland *	78	33	50.5	3.85		Wausau	73	13	40.0	0.95	
Clyde *	78	30		2.68		Wyoming.					
College Hill *	81	29	52.6	4.00		Bridge, Fort.	74	16	44.3	0.50	
Garrettsville	76	24	46.4	4.29		Fred Steele, Fort.	75	11	44.2	0.14	

NOTES AND EXTRACTS.

The following is an extract from the October, 1885, report of the "Alabama Weather Service," under direction of Prof. P. H. Mell, jr., Auburn:

The first part of the month of October was mild and pleasant, and no sudden or unusual changes occurred. Towards the close the temperature fell several degrees, and slight frosts were recorded on the 22d, 23d, and 31st. Some few stations in north Alabama reported thin ice about the same time. The average temperature for the month was 5° 3 below the normal.

The average precipitation for Alabama was slightly above the normal, and the distribution throughout the month was quite uniform, so that the dry, unhealthy condition of the atmosphere so prevalent during September and October of last year was avoided.

Some stations reported red sunsets during the month. Tusculumbia furnished the following: "The sunrise on the 31st was bright and magnificent. At sunset there was a grand and magnificent display; the sky was bright red, and the rays of light shot up from the entire western horizon, brilliant and grand as an aurora. Thus, at the close of the month, the day went out in a blaze of glory."

Summary.

Mean temperature, 60° 1; highest temperature, 86°, at Pine Apple, on the 3d; lowest temperature, 26°, at Gadsden, on the 22d; range of temperature, 60°; greatest monthly range of temperature, 58°, at Pine Apple; least monthly range of temperature, 30°, at Edwardsville; least daily range, 18° 1; greatest daily range of temperature, 44°, at Pine Apple, on the 24th; least daily range of temperature, 0°, at Prattsville, on the 29th, and at Union Springs, on the 11th.

Mean depth of rainfall, 2.59 inches; mean daily rainfall, 0.08; greatest depth of monthly rainfall, 5.08 inches, at Auburn; least depth of monthly rainfall, 0.30, at Selma; greatest daily rainfall average for state, 0.58 of an inch, on the 29th; greatest daily local rainfall, 1.95 inches, at Union Springs, on the 1st; average number of days on which rain fell, 6.

Average number of cloudy days, 8; average number of fair days, 8; average number of clear days, 15; warmest days, 1st, 17th, 18th; coldest day, 22d.

Prevailing direction of wind, northwest.

The following meteorological summary and accompanying remarks are from the October, 1885, report of the "Indiana Weather Service," under direction of Prof. W. H. Ragan, of De Pauw University, Greencastle:

Districts.	Temperature.			Average precipitation.
	Highest.	Lowest.	Monthly means.	
	°	°	°	Inches.
Northern counties	83.0	22.0	49.2	4.35
Central counties	78.0	24.0	48.5	3.26
Southern counties	85.0	26.0	51.8	2.95
State	85.0	22.0	49.9	3.52

The mean temperature for October, 1885, for the state was 8° 9 below the mean for 1882; 4° 1 below that for 1883; 7° 4 below that for 1884; and 5° 1 below the normal. At Logansport it was 1° 8 below the normal for a period of twenty-nine years; at Spiceland, 2° 1 below the normal for thirty-one years; and Indianapolis, 4° 8 below the normal for fifteen years. The warmest days were the 1st, 2d, 17th, 18th, and 25th; the coldest were the 7th, 21st, 22d, 23d, 24th, and 31st. The highest monthly mean temperature, 53° 9, is reported from Vevay; the lowest, 44° 6, is reported from Maury.

The precipitation was unevenly distributed through the month and over the state, the greatest amount falling on the 19th. It was greatest for the northern stations and least for the southern stations.

The following meteorological summary and accompanying remarks are from the October, 1885, report of the "Indiana Weather Service," under direction of Prof. H. A. Huston, of Purdue University, Lafayette:

Districts.	Temperature.			Average precipitation.
	Highest.	Lowest.	Monthly mean.	
	°	°	°	Inches.
Northern counties	83.0	28.0	49.50	3.36
Central counties	83.0	24.0	48.95	2.89
Southern counties	85.0	29.0	52.02	2.92
State	85.0	24.0	50.16	3.06

The mean temperature of the state for October is 7° 18 below that for October of last year, 5° 17 below the mean of fourteen years at Indianapolis, 5° 57 below the mean of twenty-six years at Logansport, 6° 04 below the mean of twenty-one years at Vevay, 1° 64 below the mean of thirty-one years at Spiceland, 3° 24 below the mean of six years at Maury, 8° 11 below the mean of four years at Blue Lick, 6° 64 below the mean of four years at Worthington,

and 2°.83 below the mean of six years at this station. The mean temperatures at the various stations are below the normal, the amounts ranging from 2° to 9°.

The mean precipitation for the state is 0.48 inch above that for last year; 0.44 below the mean of fourteen years at Indianapolis, 0.28 above the mean of twenty-six years at Logansport, 0.41 above the mean of twenty-one years at Vevay, 0.66 above the mean of twenty-six years at Spiceland, 0.57 below the mean of six years at Mauzy, 0.92 below the mean of four years at Blue Lick, 1.08 below the mean of four years at Worthington, and 0.32 below the mean of six years at this station. The rainfall in southern counties has been nearly normal, in central counties about 0.5 inch below the normal, and northern counties nearly an inch above the normal. The barometer is slightly below the normal.

Lunar halos are reported on seven different dates. October snows have fallen ten years in twenty-six, the heaviest being 6.45 inches in 1869.

The following is an extract from the October, 1885, report of the "Minnesota Weather Service," under direction of Prof. Wm. W. Payne, Northfield:

Reports from seventeen stations of the Minnesota Weather Service give an average mean temperature for Minnesota for October of 42°.7. This is 16°.0 colder than the preceding month of September. The warmest station was La Crosse, with a mean for the month of 46°.7. The next warmest was Winona, 45°.4. The coldest station was Park Rapids, Hubbard county (37°.7), only a few miles south of the forty-seventh parallel, and situated on the elevated watershed from whence the Mississippi and Red River of the North take their rise. The next coldest was Saint Vincent, in the extreme northwest, with a mean for the month of 40°.0.

The minimum degree of heat (12°.0) was also observed at Park Rapids on the morning of the 4th.

In the northwest the highest temperatures were recorded on the 10th; in the southwest on the 16th.

The greatest degree of heat was at Moorhead, 83°.9; the next highest, at Morris, 81°.0, on the 10th.

October this year has been a cold month, the mean temperature being much below the normal throughout the state, except in the Upper Red River Valley, where the month has been from 1°.5 to 3°.0 above the normal. At Duluth, St. Paul, and La Crosse the month was colder than October, 1884, by averages of 4°.0, 8°.6, and 7°.4, respectively. The low mean of the month is due more to the uniformly low temperatures rather than to extremes, of which indeed there was a noticeable absence, the temperature rarely falling 20°.0 at any station in the state. The warmest days were the 1st, 2d, 9th, 10th, 16th, 24th, and 25th. The coldest were the 4th, 5th, 19th, 20th, 21st, 22d, 23d, 28th, and 29th. Minimum temperatures of 20°.0, or below, were registered west of a line drawn from Sherburne, Martin county, northeast to Aitkin, Aitkin county. Frosts were frequent and severe, being incident to nearly every day of the month.

Sherburne, 4th.—Heavy frost, temperature, 20°.0 between daylight and sunrise.

The rainfall for October has been deficient in amount to a marked degree throughout all parts of the state. All stations in the north and west report less than one inch for the month. In the southeast, with the exception of the immediate vicinity of the Mississippi River, the precipitation has slightly exceeded one inch. The largest amount recorded was at Northfield, 2.04 inches. The least amount was at Wadena, where the amount for the month was too small for measurement. The average for the state was only 0.92 inch.

The dryness of the ground has interfered to some extent with fall plowing, but at the end of the month the land, especially in the Red River Valley, was all prepared under the most favorable conditions for the next season's crop of grain. Thin ice formed on many nights, but even in the more northerly districts the frost was at no time sufficiently severe to interfere with agricultural work. Water has been very scarce in western Minnesota, and many wells have altogether failed. The streams and rivers are very low, and there is a well-grounded apprehension that unless the November rains and snows are abundant there will be a great scarcity of water for manufacturing and other purposes. The rainfall has been especially deficient for September and October at the headwaters of the Mississippi River, and, as a consequence, the river will probably be at a very low stage during the coming winter.

The following is an extract from the October, 1885, report of the "Missouri Weather Service," under direction of Prof. Francis E. Nipher, Saint Louis:

At the central station the mean temperature of October has been slightly below the normal, but at no time has the temperature of the air fallen lower than 36°. In former years the temperature of the air at Saint Louis has once fallen below the freezing point as early as October 4th (1836).

The month opened with light rains in the early part of the first decade, clearing on the fifth, with slightly falling temperature. The average temperature of the first decade was 56°.5, which was one degree above the average for the entire month. The second decade was about two degrees above the average for the month, with a rain of over two inches on the 13th and 14th, and a heavy local rain of 3 inches on the night of the 27-28th.

In the state the temperature of the air has fallen to, or below, 32° at all stations, excepting Hannibal (33°) and Cairo, Illinois (38°.8). The lowest temperatures reported are 18° (possibly 28°), at Graham; Kirksville, 26°; Ironton, 27°; Steelville and Sedalia, 28°.

The rainfall has been less than 2 inches in the extreme southern part of the state and over the entire drainage area of the Osage River, and extending eastward of the mouth of the Osage along the lower Missouri valley to near Saint Charles. To the eastward of Saint Charles the rainfall increases very rapidly, being seven inches at the central station. In the northwest part of the state the rainfall increases to over 5 inches.

The following is an extract from the October, 1885, report of the "Nebraska Weather Service," under direction of Prof. Goodwin D. Swezey, of Doane College, Crete:

The temperature of the month has been a few degrees below the normal, with an unusually large number of frosts and cold nights. Hail and thunderstorms have naturally been less in proportion, no hail being reported, and only one or two thunderstorms.

The amount of precipitation, and also the number of rainy days and of fogs, has been nearly normal. A slight fall of snow occurred in the northern part of the state on the 18th. The amount of cloudiness is quite below the normal. The average rain for the different sections of the state for October, 1885, is as follows: Northeast section, 2.51 inches; southeast section, 2.71; northwest section, 1.36; southwest section, 2.44.

The following is an extract from the October, 1885, "Bulletin of the New England Meteorological Society," under direction of Prof. Winslow Upton, Providence, Rhode Island:

General conditions.—Fair weather characterized the month, the rains, though abundant in quantity, having been confined to a small number of days. Frosts were numerous, but the agricultural season closed with the minimum of damage from this cause.

Precipitation.—The rainfall for the month was largely in excess of the average. The chief peculiarity of the record is that the rains in each of the four general storms of the month were large, though irregularly distributed. The fall on the 6th instant was light, and at a few stations, mostly in New Hampshire and Vermont, none was reported. Excessive rainfalls were: Newport, Vermont, 3.11 inches, 21st; Providence, 3.62 inches, 13-14th; Saint John, 3.72 inches, 29-30th. Snow was noted at a very few stations.

Temperature.—The temperature averages 0°.4 below the normal. There were no extremes of temperature; the highest temperatures were generally noted the first of the month, and the lowest near the close.

Pressure.—Five barometric depressions passed near the district on the 4th, 6th, 14th, 21st, and 30th, respectively. Of these, the first and third moved from the Lakes down the Saint Lawrence Valley, the latter having moved northwesterly from the eastern Gulf states before pursuing its northeasterly path. The fifth moved southeasterly from Nebraska to Tennessee, where it turned northeasterly and passed along the coast. These three depressions were all attended by heavy rains and high winds, and by thunder and lightning, which was especially marked in the first. Thus, on the 3d instant, thunder was noted at Setauket, 4.30 a. m., Providence, 10.20 a. m., Gardiner, 8 p. m., Saint John, 9 p. m., and at other stations at intermediate times. On the 4th the northern stations, and a few near the coast, report thunder and lightning at varying hours in the afternoon. On the 14th a few coast stations reported lightning in the evening, and on the 29th thunder and lightning were noted in the evening at a few stations in Connecticut. The storm of the 3d was very severe in southern Rhode Island.

The following is an extract from the October, 1885, report of the "Ohio Meteorological Bureau," under direction of Prof. B. F. Thomas, of the Ohio State University, Columbus:

The mean atmospheric pressure for October, 1885, is considerably lower than for the same month of the two preceding years, and it is very remarkable when the mean temperature is considered, which is much lower than that of the years 1883 and 1884. The maximum pressure was .242 of an inch lower than 1883, and .153 lower than 1884. The minimum is lower than that of 1884, but higher than that of 1883.

The mean humidity was very nearly the average of the past three years. The most noticeable feature of the weather was the low mean temperature for the month, this being 49°.9. The normal for the month is 52°.3. The mean for October, 1885, is 3°.5 lower than that of 1883, and 6°.4 lower than that of 1884. The maximum temperature for the month, 83°.0, is 4°.0 lower than that of 1883, and 16°.0 lower than that for the same month of 1884. The minimum was also lower for this year. The minimum for October, 1883, was 25°.0, for 1884, 18°.0, for 1885, 14°.0, thus making it 11°.0 lower than 1883, and 4°.0 lower than 1884. Thus it is seen that October, 1885, is the coldest October that has been reported by the bureau.

The mean rainfall for the month, 3.80 inches, is .67 of an inch above the normal, and almost exactly the mean for October of the last three years. The rainfall for the month was evenly distributed throughout the month, no large rainfall being reported on any one day.

State summary for October, 1885.

Mean barometer, 29.997 inches; highest barometer, 30.899 inches, at Dayton, on the 9th; lowest barometer, 29.441, inches, at McConnellsville, on the 29th; range of barometer, .958 inch.

Mean relative humidity, 78.8 per cent.
Mean temperature, 49°.9; highest temperature, 83°.0, at Hanging Rock, on the 18th; lowest temperature, 14°.0, at Wauseon, on the 31st; range of temperature, 69°.0; mean daily range of temperature, 20°.4; greatest daily range

of temperature, 45°.0, at College Hill, on the 10th, and at Hanging Rock, on the 18th; least daily range of temperature, 4°.5, at Napoleon, on the 6th.

Average number of clear days, 9.0; average number of fair days, 8.5; average number of cloudy days, 13.5; number of days on which rain fell, 12.2.

Mean rainfall, 3.30 inches; average daily rainfall, .106 inch; greatest rainfall, 5.29 inches, at New Alexandria; least rainfall, 1.56 inches, at Sidney.

Prevailing direction of wind, southwest.

The following is an extract from the Tennessee "State Board of Health Bulletin," for October, 1885, prepared under direction of J. D. Plunkett, M. D., President of the State Board of Health. The summary is prepared by Major H. C. Bate, in charge of the State Meteorological Service:

The meteorological features for October were, for the most part, unimportant. The weather during the greater portion of the month was remarkably pleasant.

The mean temperature for the month was 54°.44, which was considerably below the mean for October of the two years previous, being 9°.29 below that in 1884, and 7°.78 below that in 1883. The mean of maximum temperature was 77°.06, and the mean of minimum temperature was 33°.12, respectively 14°.94 below and 4°.12 above those for October of last year. The range of temperature was 23° less than in October last year, and 10° less than in October, 1883. The highest temperature was recorded about the 17th and 18th, and was 14° lower than the maximum during the corresponding period last year. The lowest temperature was recorded on the 22d, and was only 1° above the minimum of October of last year. The average precipitation for the month was 3.73 inches, only .07 inch less than that for October of last year. In this, the eastern division received a large proportion, having an average fall of nearly six inches; the middle division having a little more than three inches, and the western division a little more than two inches. The days of the greatest rainfall were the 1st, 2d, 3d, 12th, 19th, 28th, and 29th, and of these the greatest fall occurred on the 29th, the same date as the greatest fall during September. As in the month previous, some of the local rainfalls were quite heavy, the greatest being 3.20 inches, reported at Fostoria. More than two inches were reported from several other stations in the eastern division. The greatest rainfall during the month was 7.86 inches, reported at Knoxville, and was the greatest October rainfall at that station in fifteen years, the next greatest being 5.40 inches in October, 1878. The above-named were general rains, except that of the 19th, which was confined to the middle and western divisions.

The rain of the 28th, was heaviest in the western division. Many of the rains were very light showers. The rainless days were the 7th, 8th, 9th, 15th, 21st, 22d, and 24th.

State summary.

Mean temperature, 54°.44; highest temperature, 85°, on the 18th, at Somer-

ville; lowest temperature, 30°, on the 22d, at Rogersville, Andersonville, Fostoria, Cookeville, Manchester, Beech Grove, Riddleton, Hurricane Switch, and Trenton; range of temperature, 54°; mean monthly range of temperature, 44°; greatest monthly range of temperature, 53°, at Milan and Covington; least monthly range of temperature, 30°, at Greenville; mean daily range of temperature, 18°; greatest daily range of temperature, 39°; on the 24th, at Beech Grove; least daily range of temperature, 2°, on the 1st, at Careyville; on the 2d, at Paris; on the 3d, at Jonesborough, Riddleton, and Dickson; on the 18th, at Cookeville and Ashwood; on the 20th, at Bolivar, and on the 29th, at Austin; mean of maximum temperatures, 77°.06; mean of minimum temperatures, 33°.12.

Mean depth of rainfall, 3.73 inches; mean daily rainfall, 0.12 inch; greatest rainfall, 7.86 inches, at Knoxville; least rainfall, 0.89 inch, at Somerville; greatest local daily rainfall, 3.20 inches, on the 29th, at Fostoria; days of greatest rainfall, 1st, 2d, 3d, 12th, 19th, 28th, 29th; day of greatest rainfall, 29th.

Average number of days on which rain fell, 8; average number of clear days, 12.7; average number of fair days, 9; average number of cloudy days, 9.3; rainless days, 7th, 8th, 9th, 15th, 21st, 22d, 24th; warmest days, 17th, 18th; coldest day, 22d.

Prevailing wind, northwest.

Table showing average amount of ozone reported from thirteen stations for the month of October, 1885.

Stations.	Mean of day observation.	Mean of night observation.	Highest.	Date. A. M.	Highest.	Date. P. M.
Rogersville a	3.26	3.66	7	12½	8	13½, 14½.
Careyville	3.20	2.97	6	25*	8	25*, 26½, 28½, 31½.
Cookeville	0.76	0.76	10	21*, 29½, 30½, 31½	8	20½, 29½.
McMinnville b	2.80	4.13	8	29½	7	14*, 31½.
Riddleton	4.13	4.10	7	1½, 2½, 3½, 15*	8.5	31*.
Florence Station	5.24	3.95	9	28½	3	38, 5*.
Nashville	0.74	0.58	5	4*	7	28½.
Hurricane Switch c	3.81	3.56	6	2½, 29½	6	27½, 29½, 31½.
Ashwood c	2.70	2.70	5	20½, 29½	1	19½, 20*, 21*, 22*, 30*, 31½.
Dickson d	1.06	0.35	4	29½	8	27½, 28½.
Milan b	4.40	3.07	7	21*	8	28½, 29½.
Trenton	4.71	3.52	8	20½	1	8, 20, 22.
Memphis e	0.65	0.12	2	21, 23		

State of weather indicated thus: * Clear; † Fair; ‡ Cloudy; § Rain. a, 1st to 15th; b, 17th to 31st; c, 16th to 31st; d, 15th to 31st; e, 26 days.